Chapter 8 Permitting and Other Regulatory Issues

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Chapter 8 Permitting and Other Regulatory Issues

This chapter provides a guide to permitting and other regulatory issues. In general, there have been few permits required for farm biogas systems. Today, however, permitting activities for all farm manure management systems are increasing.

Obtaining the required environmental, siting, and other permits is an essential step in the project development process. Permit conditions may affect project design, and neither construction nor operation should begin until all permits are in place. The process of permitting a digester gas-to-energy project may take anywhere from 4 to 9 months to complete, depending on the project's location and recovery technology. For example, a project sited in a location that requires no zoning variances will probably take much less time to permit than a project subject to zoning hearings.

It should be noted that states are generally granted the authority to implement, monitor, and enforce the federal regulations by establishing their own permit programs. As a result, some state permit program requirements are more stringent than those outlined in the federal regulations and there is a large state-to-state variance in agencies and standards. For this reason, owner/operators and project developers should determine state and local requirements before seeking project permits.

8-1. The Permitting Process

There are four general steps (outlined in the flowchart in Exhibit 8-1) in the permitting process:

- **Step 1. Hold preliminary meetings with key regulatory agencies.** Meet with regulators to identify permits that may be required and any other issues that need to be addressed. These meetings also give the developer the opportunity to educate regulators about the project, since biogas technologies may be unfamiliar to regulators.

- **Step 2. Develop the permitting and design plan.** Determine the requirements and assess agency concerns early on, so permit applications can be designed to address those concerns and delays will be minimized.

- **Step 3. Submit timely permit applications to regulators.** Submit complete applications as early as possible to minimize delays.

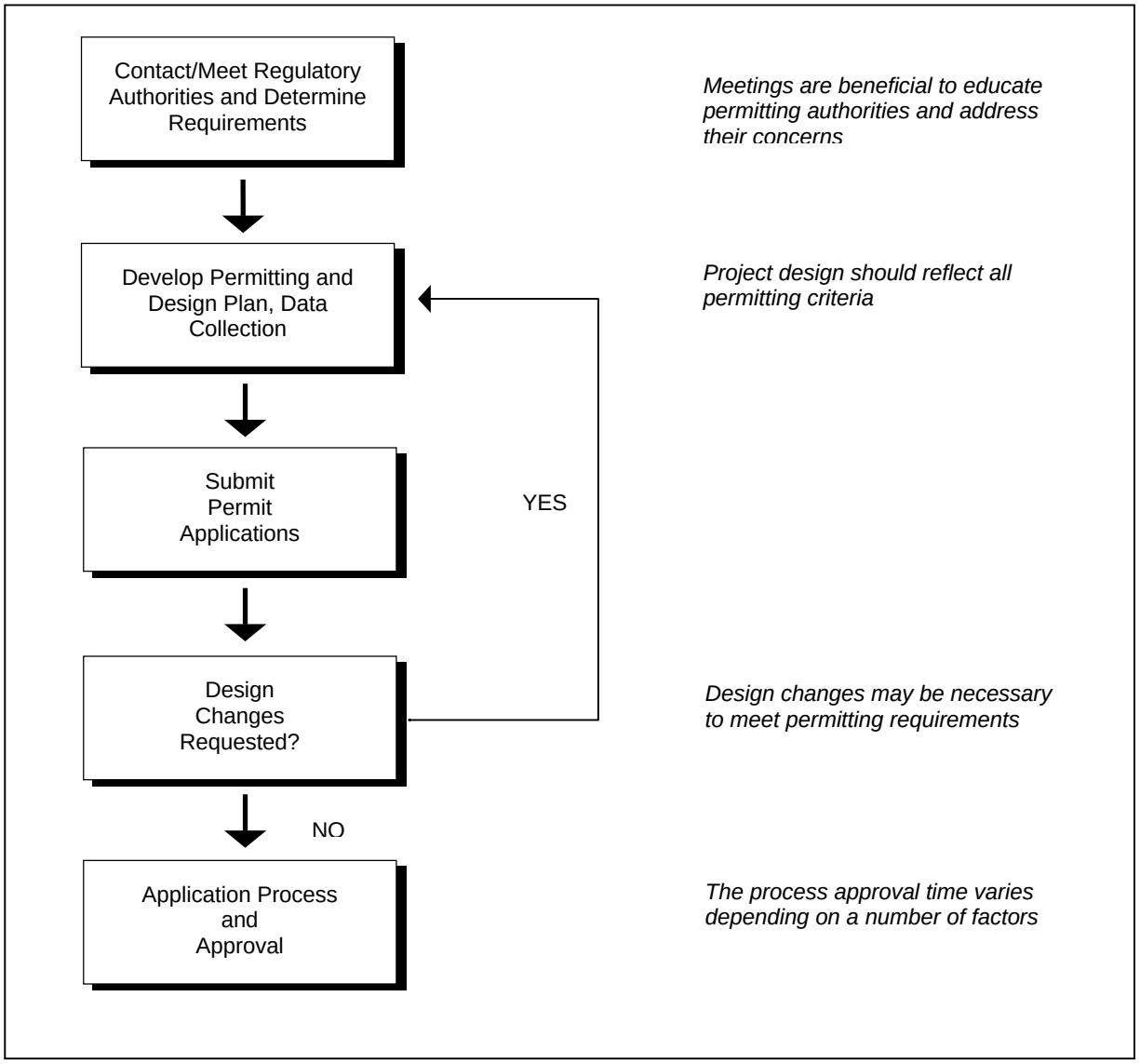
- **Step 4. Negotiate design changes with regulators in order to meet requirements**. Permitting processes sometimes provide opportunities to negotiate with regulators. If negotiation is allowed, it may take into account technical as well as economic considerations.

As these steps indicate, the success of the permitting process relies upon a coordinated effort between the developer of the project and various agencies who must review project plans and analyze their impacts. Project developers might have to deal with separate agencies with overlapping jurisdictions, underscoring the importance of coordinating efforts to minimize difficulties and delays.

In some cases, permitting authorities may be unfamiliar with the characteristics and unique properties of biogas. Where appropriate, the owner/operator or project developer should approach the permitting process as an opportunity to educate the permitting authorities, and should provide useful, targeted information very early in the process. Local and state NRCS representatives may be of assistance regarding whom to contact.

Emphasizing the pollution and odor control aspects of biogas energy recovery projects can be an effective approach in seeking permits and may make the permitting process much easier.

Exhibit 8-1 The Permitting Process



Local approval of a project is crucial to its success. This approval refers not only to the granting of permits by local agencies, but also to community acceptance of the project. Strong local sentiment against a project can make permitting difficult, if not impossible.

8-2. Zoning and Permitting

Project siting and operation are governed by local jurisdictions (in addition to federal regulations). Therefore, it is imperative to work with regulatory bodies throughout all stages of project development to minimize permitting delays, which cost both time and money. This is especially important since the pollution prevention benefits of projects may not initially be considered.

8-2.1 Zoning/Land Use

The first local issue to be addressed is the compatibility of the project with community land use specifications. Projects on existing farms should have few problems. Most communities have a zoning and land use plan that identifies where different types of development are allowed (e.g., residential, commercial, industrial). The local zoning board determines whether or not land use criteria are met by a new farm project, and can usually grant variances if conditions warrant.

8-2.2 Permitting Issues

In addition to land use specifications, local agencies have jurisdiction over a number of other parameters that may or may not be applicable to the project or location, such as the following:

- **Confined Animal Facility Operation Permits (CAFO).** Depending on the size of the animal confinement operation, a state agency regulated confined animal facility operation (CAFO) permit may be in force. The permit was developed under the National Pollution Discharge Elimination System (NPDES). Generally, any alteration in methodologies employed to manage manure require review and approval by that agency. Discussion of project benefits (odor, pathogen, weedseed, nutrient mineralization) may aid the regulators during preliminary conversation and subsequent authorization.

- **Recycling.** Projects with financial viability dependent on sale of recycled materials likely are subject to review of the state/regional agency governing recycling programs. Some degree of marketing research and product purchase commitment may be required. This is particularly true of projects generating revenues through the receipt of “tipping” fees to receive wastes for disposal and processing. Regulators do not want materials received for an income-generating fee to accumulate and not be subsequently sold.

- **Noise.** Most local zoning ordinances stipulate the allowable decibel levels for noise sources. These levels vary, depending on the zoning classification at the source site (e.g., a site located near residential areas will have a lower decibel requirement than one located in an isolated area). Even enclosed facilities may be required to meet these requirements; therefore, it is important to keep them in mind when designing project facilities.

- **Wastewater.** All farms remain under zero discharge rules for digester effluent. The CAFO permits control facilities and operations.

- **Water.** Water requirements depend on the type and size of the project. If current facilities cannot meet the needs of the project, then new facilities (e.g., pipeline, pumping capacity, wells) may need to be constructed. Groundwater permits could be required if new wells are needed to supply the project's water needs.

- **Solid Waste Disposal.** The only solid wastes generated by a biogas project are likely packaging materials, cleaning solvents, and equipment fluids. While there may only be a small amount of solid waste generated, it must be properly disposed.

- **Stormwater Management.** State environmental agencies regulate stormwater management, and may require a permit for discharges during construction and operation. Good facility design that maintains the predevelopment runoff characteristics of the site allows the project to easily meet permitting requirements.

8-3. Community Acceptance

As any project developer will attest, community support is extremely important to the success of a project, especially since some communities require public participation in project zoning/siting cases. Many farms are encountering local opposition such as the "not in my backyard (NIMBY)" syndrome, or perceptions of project impacts (e.g., odor, groundwater pollution). Therefore, it is important to educate the public and to develop a working relationship with the neighboring community in order to dispel any fears or doubts about the expected impact

of the project. Project details should always be presented in a very forthcoming and factual manner.

Biogas projects bring many benefits to the neighboring community (e.g., improved air quality, reduction of odor and pollution potential). These benefits should be emphasized during the permitting process. AgSTAR materials may be used to fulfill some of these needs.

8-4. Regulations Governing Air Emissions from Energy Recovery Systems

New Source Review (NSR) is a preconstruction review program under the Clean Air Act that applies to new and modified major sources. In almost all cases, farm scale biogas systems will be too small to trigger NSR permitting. NSR most likely will apply only to biogas-fueled boilers, engine-generator sets, and flares for very large projects and projects on farms near large urban areas. However, each state has a permitting program for new or modified minor sources. The emission thresholds for requiring a minor source permit or registration vary by state. Therefore, you should check with your local air permitting authority about permit requirements early in the planning process.

> Links to state and local air pollution control agencies can be found at www.cleanairworld.org.

Regulations have been promulgated under the Clean Air Act governing airborne emissions from new and existing sources. These regulations require new or modified major sources to undergo the NSR process before they can commence construction. The addition of a biogas recovery system at an existing farm would be an example of a modified source. The purpose of NSR is to ensure that new and modified major sources meet the applicable air quality standards and that emissions are controlled using state-of-the-art technology.

The permit requirements will vary depending on local air quality. All areas of the country are classified by their attainment status with National Ambient Air Quality Standards (NAAQS) for six pollutants - sulfur dioxide, particulate matter, nitrogen dioxide, carbon dioxide, lead, and ozone. Areas that meet the NAAQS for a particular air pollutant are classified as in "attainment" for that pollutant. Areas that do not meet the NAAQS are classified as in "nonattainment" for that pollutant.

Permitting requirements are more stringent for nonattainment areas. Under NSR, sources in attainment areas undergo Prevention of Significant Deterioration (PSD) permitting while those in nonattainment areas undergo nonattainment area NSR permitting. Nonattainment area permitting requires more stringent emission controls and imposes other requirements. Because a location can be classified as attainment for some pollutants and nonattainment for others, a source may be permitted under both PSD and nonattainment area NSR. For example, a biogas combustion engine may be reviewed under PSD for carbon monoxide and nonattainment NSR for ozone.

In summary, small projects that are typical of most farm scale biogas systems may find the air permitting process to be quite straightforward. Very large projects (i.e., >500 kW), particularly those in urban nonattainment areas, may require NSR. The process of obtaining a NSR permit can be extensive and can require lead times of 6 to 9 months to obtain a permit. Construction of a project cannot begin until the permit is issued. Given the complexity of the air permitting regulations, an owner/operator may wish to consult an expert familiar with the NSR process in a particular area.

8-4.1 NO_x Emissions from Energy Conversion

Combustion of biogas -- in an engine, turbine, or boiler -- generates nitrogen oxides (NO_x). For biogas combustion sources, NO_x is likely to be the emission of greatest concern to state air pollution regulators. Nitrogen oxides contribute to the formation of atmospheric ozone and fine particulate matter. Obtaining a permit may require selection of a combustion device with low NO_x emissions.

Reciprocating Internal Combustion Engines

There are two basic types of reciprocating engines: naturally aspirated and fuel injected lean-burn:

- **Naturally Aspirated** engines draw combustion air and biogas through a carburetor in stoichiometric proportions, much the same way that an automobile equipped with a carburetor would draw its air/fuel mixture. Just enough air is drawn into the combustion chamber to ignite the air/biogas mix. In addition, residence time in the combustion chamber is relatively long. Therefore, this type of engine emits relatively high levels of NO_x

- **Fuel injected lean-burn** engines inject biogas into the combustion chamber along with air that is in excess of the stoichiometric mix. This type of engine provides both greater engine power output and fewer NO_x emissions than a comparable naturally aspirated engine. In recent years, manufacturers have developed engines with very low NO_x emissions.

When internal combustion engines are used in conventional natural gas applications, catalysts can be used to reduce NO_x emissions. To date, catalysts have not been required in any farm scale applications because the impurities found in biogas quickly limit the ability of the catalyst to control NO_x emissions.

Turbines and Boilers

With modern designs, gas-fired boilers and turbines emit levels of NO_x that are lower than fuel injected lean burn internal combustion engines. For typical farm scale systems, additional controls should not be required to obtain a permit.

8-4.2 SO_x Emissions from Energy Conversion

Combustion of biogas also can generate sulfur oxides (SO_x). Sulfur oxides are generated when biogas containing hydrogen sulfide and other reduced sulfur compounds are combusted. Sulfur oxides contribute to the formation of fine particulate matter.

In some areas, obtaining a permit may require installation of a scrubbing technique to remove hydrogen sulfide and other reduced sulfur compounds before biogas combustion. It is likely that only biogas produced from large swine operations would contain enough sulfur compounds to warrant the consideration of scrubbing.